

### REMARKS

Claims 3-13 are pending in the present application. Claims 3-13 have been amended herein. Claim 2 has been cancelled herein.

#### **I. CLAIM AMENDMENTS**

##### **A. Claim 4**

Claim 4 depends on claim 2. Applicant has amended claim 4 to include the elements of claim 2, and has cancelled claim 2. Since Applicant merely has amended claim 4 to be in independent form, Applicant respectfully submits that this amendment to claim 4 should be entered. Also, Applicant submits that this amendment to claim 4 is not a narrowing element that further limits claim 4.

##### **B. Claims 3 and 5-13**

Claims 3 and 5-13 have been amended to change the dependency of these claims to claim 4. Since these amendments merely change the dependency of these claims, Applicants submit that these amendments do not require a further search or consideration by the Examiner. Therefore, Applicant respectfully requests the Examiner to enter these claim amendments.

#### **II. FORMAL MATTERS**

##### **A. Information Disclosure Statements**

Applicant notes with appreciation that the previous office action mailed on January 15, 2002 includes a copy of the PTO Form 1449 that was submitted with the Information Disclosure Statement filed on January 26,

2001. The references cited therein are initialed by the Examiner, thereby indicating that these references were considered by the Examiner.

It appears that the Examiner has not sent to the Applicant copy of the PTO Form 1449 that was submitted with the Information Disclosure Statement filed on April 10, 2002. Applicant respectfully requests the Examiner to do so.

#### B. Drawings

It appears that the Examiner has not indicated yet whether the formal drawings filed on November 3, 2000 are acceptable. Applicant respectfully requests the Examiner to do so.

### III. PRIOR ART REJECTIONS

#### A. Claims 2, 3, 5-7 and 12

Claims 2, 3, 5-7 and 12 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,860,611 (Flanagan). This rejection is traversed.

Claim 2 has been cancelled herein. Therefore, the rejection of claim 2 is moot. Regarding the rejection of claims 3, 5-7 and 12, Applicant respectfully submits that Flanagan does not teach or suggest a web section that is circumferentially continuous, as recited by claim 4, on which claims 3, 5-7 and 12 depend. Rather, the web section of the hub 3 of Flanagan includes a plurality of spokes having gaps therebetween in the circumferential direction, as shown in Figs. 1 and 2 of Flanagan.

This circumferentially continuous configuration of the present invention, which is shown in Fig. 4 of the present invention, results in a hub that has a stiffness significantly stiffer than that of Flanagan. In fact, Flanagan is described in the "Description of Related Art" section in the present specification and depicted in Fig. 1 of the present invention. The advantages of the present

invention over the configuration taught by Flanagan is further described on page 3, lines 3 through 17 and page 7, line 23 through page 8, line 25 of the present specification.

Since Flanagan does not teach or suggest each and every element of claims 3, 5-7 and 12, Applicant respectfully submits that these claims are not anticipated by Flanagan. Therefore, Applicant submits that the rejection of claims 3, 5-7 and 12 under 35 U.S.C. § 102(b) is overcome.

Since Flanagan does not suggest the above-mentioned feature of claims 3, 5-7, and 12, Applicant submits that none of the pending claims would have been obvious over Flanagan.

#### B. Claims 2, 4, and 6

Claims 2, 4, and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,816,114 (Gregoire). This rejection is traversed.

Claim 2 has been cancelled herein. Therefore, the rejection of claim 2 is moot. Regarding the rejection of claims 4 and 6, Applicant respectfully submits that Gregoire does not teach or suggest a hub comprising a substantially planar web section, as recited by claim 4, on which claim 6 depends. Rather, the hub 22 of Gregoire includes disc portions 22' and 22'' that are angled by a dihedral angle relative to plane of the hub 22, as shown in Fig. 2 of Gregoire (see column 5, lines 32-35). The Examiner asserts that the web section of Gregoire is substantially planar. However, as clearly shown in Fig. 2, the disc portions 22' and 22'' clearly extend upward and outward. Therefore, the web section of Gregoire is not substantially planar.

Also, Applicant submits that Gregoire does not teach or suggest hub comprising a central core in tight interference fit with a rotary shaft, as recited by claim 4, on which claim 6 depends. Rather, the hub 22 of Gregoire is joined

to the shaft 12 with an adhesive joint 26' (see column 4, lines 48 through 57, and Fig. 2).

Since Gregoire does not teach or suggest each and every element of claims 4 and 6, Applicant respectfully submits that these claims are not anticipated by Gregoire. Therefore, Applicant submits that the rejection of claims 4 and 6 under 35 U.S.C. § 102(b) is improper.

Since Gregoire does not suggest the above-mentioned feature of claims 4 and 6, Applicant submits that none of the pending claims would have been obvious over Gregoire.

#### C. Claims 8 and 10

Claims 8 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,816,114 (Gregoire). This rejection is traversed.

As presented above with respect to the rejection of claims 2, 4 and 6, Applicant respectfully submits that Gregoire does not teach or suggest a hub comprising a substantially planar web section, as recited by claim 4, on which claims 8 and 10 depend. Rather, the hub 22 of Gregoire includes disc portions 22' and 22" that are angled by a dihedral angle relative to plane of the hub 22, as shown in Fig. 2 of Gregoire (see column 5, lines 32-35).

Also, Applicant submits that Gregoire does not teach or suggest hub comprising a central core in tight interference fit with a rotary shaft, as recited by claim 4, on which claims 8 and 10 depend. Rather, the hub 22 of Gregoire is joined to the shaft 12 with an adhesive joint 26' (see column 4, lines 48 through 57, and Fig. 2).

Since Gregoire does not teach or suggest each and every element of claims 8 and 10, Applicant respectfully submits that claims 8 and 10 would

not have been obvious over Gregoire. Therefore, Applicant submits that the rejection of claims 8 and 10 under 35 U.S.C. § 103(a) is improper.

D. Claim 11

Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,816,114 (Gregoire) in view of U.S. Patent No. 5,628,232 (Bakholdin). This rejection is traversed.

As presented above with respect to the rejection of claims 2, 4 and 6, Applicant respectfully submits that Gregoire does not teach or suggest a hub comprising a substantially planar web section, as recited by claim 4, on which claim 11 depends. Rather, the hub 22 of Gregoire includes disc portions 22' and 22'' that are angled by a dihedral angle relative to plane of the hub 22, as shown in Fig. 2 of Gregoire (see column 5, lines 32-35).

Also, Applicant submits that Gregoire does not teach or suggest hub comprising a central core in tight interference fit with a rotary shaft, as recited by claim 4, on which claim 11 depends. Rather, the hub 22 of Gregoire is joined to the shaft 12 with an adhesive joint 26' (see column 4, lines 48 through 57, and Fig. 2).

Bakholdin fails to make up for these deficiencies of Gregoire. As shown in Figs. 2 and 4, the hub portion 100 of Bakholdin comprises a conical web section 13. This web section 13 is not substantially planar, as recited by claim 4. Also, the web section 13 is not integrally formed to a central core, as recited by claim 4. Rather, Bakholdin teaches that the web section 13 is made of a filament wound composite, and that the hub portion 100 is made of a filament wound fiberglass composite cylinder member 18 and an aluminum cylinder 17 (see column 4, lines 17-29).

Since the combination of Gregoire and Bakholdin does not form the invention defined by claim 11, Applicant respectfully submits that claim 11

would not have been obvious over Gregoire in view of Bakholdin. Therefore, Applicant submits that the rejection of claim 11 under 35 U.S.C. § 103(a) is improper.

E. Claims 2, 3, 4 and 13

Claims 2, 3, 4 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,634,381 (Thoolen) in view of U.S. Patent No. 5,012,694 (McGrath). This rejection is traversed.

Claim 2 has been cancelled herein. Therefore, the rejection of claim 2 is moot. Regarding the rejection of claims 3, 4 and 13, Applicant respectfully submits that Thoolen does not teach or suggest a hub having a web section that is substantially planar, as recited by claim 4, on which claim s 3 and 13 depend. Rather, the flywheel taught by Thoolen includes an S-shaped flange 6 that couples the axle 2 to the rotor 4, as shown in the figure of Thoolen and as taught in column 2, lines 13-27.

McGrath fails to make up for these deficiencies of Thoolen. As shown in Figs. 1 and 2 of McGrath, the support member 22 of McGrath is not substantially planar. Rather, the supporting member is angled in the plane perpendicular to the shaft axis 21. Since the combination of Thoolen and McGrath does not form the invention defined by claims 3, 4 and 13, Applicant respectfully submits that claims 3, 4, and 13 would not have been obvious over Thoolen in view of McGrath. Therefore, Applicant submits that the rejection of claims 2, 3, 4 and 13 under 35 U.S.C. § 103(a) is improper.

Based on the foregoing, Applicant submits that the present application is in condition for allowance. If the Examiner has any questions, or believes that a telephone conference would expedite the prosecution of the present application, Applicant respectfully requests the Examiner to contact the undersigned at the telephone number listed below.

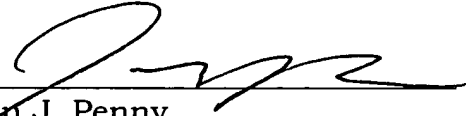
Norman C. Brackett  
U.S.S.N. 09/706,060  
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Applicant petitions for a two-month extension of time under 37 C.F.R. Section 1.136 (fees: 37 C.F.R. Section 1.17(a)(1)-(4) and includes with this response the appropriate fees therefor.

Applicant believes that no additional fees are due for the subject application. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. **04-1105**.

Respectfully submitted,

By

  
John J. Penny  
Registration No. 36,984  
Dike, Bronstein, Roberts & Cushman  
Intellectual Property Practice Group  
Edwards & Angell  
P.O. Box 9169  
Boston, MA 02209  
Tel: (617) 439-4444

Date: March 14, 2003

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PATENT TRADEMARK OFFICE

**ANNEX TO RESPONSE TO OFFICE ACTION**  
**PURSUANT TO 37 CFR 1.114**  
**CONTAINING MARKED-UP VERSION OF AMENDED CLAIMS**

3. (Twice Amended) A stiff, metallic hub as recited in claim 42, wherein the hub is manufactured of material selected from the group comprising aluminum, titanium, and steel.

4. (Twice Amended) A stiff, metallic hub for an energy storage device, having a flywheel assembly, wherein the hub produces a critical velocity that exceeds a design operating speed of the flywheel assembly, the stiff, metallic hub comprising:

a central core in tight interference fit with a rotary shaft of the flywheel assembly;

an outer rim section in tight interference fit with a high-strength, low-density composite fiber rim of the flywheel assembly;

a substantially planar web section, ~~A stiff, metallic hub as recited in claim 2,~~ wherein the web section is circumferentially continuous; and

wherein the web section is integrally formed to the central core and the outer rim section.

5. (Twice Amended) A stiff, metallic hub as recited in claim 42, wherein the critical velocity is between about 1.4 and about 3.0 times the design operating speed of the flywheel assembly.

6. (Twice Amended) A stiff, metallic hub as recited in claim 42, wherein at high operating speeds, the outer rim section is capable of deforming in a radial direction commensurate with radial deformation of the composite



fiber rim of the flywheel assembly to maintain a tight interference fit to substantially minimize vibrations.

7. (Twice Amended) A stiff, metallic hub as recited in claim 42, wherein the design operating speed of the flywheel assembly is about 22,500 revolutions per minute.

8. (Amended) A stiff, metallic hub as recited in claim 42, wherein the central core has a critical length to maintain a tight interference fit with the rotary shaft of the flywheel assembly, wherein the critical length is about 1.8 inches at an operating speed of about 22,500 revolutions per minute.

9. (Amended) A stiff, metallic hub as recited in claim 42, wherein the outer rim section has a critical length to maintain a tight interference fit with the composite fiber rim of the flywheel assembly, wherein the critical length is about 10 inches for an operating speed of about 22,500 revolutions per minute.

10. (Amended) A stiff, metallic hub as recited in claim 42, wherein the web section has a thickness of about 7/8 inch at an operating speed of about 22,500 revolutions per minute when the rotary shaft is supported by mechanical bearings.

11. (Amended) A stiff, metallic hub as recited in claim 42, wherein the web section has a thickness of about 2.4 inches at an operating speed of about 22,500 revolutions per minute when the rotary shaft is supported by magnetic bearings.

12. (Amended) A stiff, metallic hub as recited in claim 42, wherein the outer rim includes at least one balancing rail for balancing the flywheel assembly to substantially minimize vibrations.

13. (Amended) A stiff, metallic hub as recited in claim 42, wherein the outer rim includes an axial stop to prevent the composite fiber rim from falling off of the outer rim of the hub during high speed operation.